

In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. - 8. (Canceled)

9. (Previously Presented) A data transfer procedure for transferring data of a data sequence to a receiving entity from a transmitting entity comprising:

transferring down from a higher data handling layer of the transmitting entity to a lower data handling layer of the transmitting entity a plurality of data ~~unit~~ units of the data sequence, wherein each of the plurality of data units has a relative position in the data sequence;

buffering, at the higher data handling layer of the transmitting entity, the plurality of data units;

transmitting on a first transmission link from the lower data handling layer of the transmitting entity each of the plurality of data units to the receiving entity;

buffering, at the lower data handling layer of the transmitting entity, the plurality of data units;

receiving at the lower data handling layer of the transmitting entity an acknowledgement of receipt of at least one later positioned one of the plurality of data units from the receiving entity;

sending a confirmation of receipt of the at least one later positioned one of the plurality of data units from the lower data handling layer of the transmitting entity to the higher data handling layer of the transmitting entity based on the acknowledgement;

discarding in-sequence any buffered data units at the higher data handling layer of the transmitting entity based on received confirmations;

determining that the first transmission link is broken;

purging the buffered plurality of data units at the lower data handling layer of the transmitting entity upon determining the first transmission link is broken;

maintaining the buffering of the at least one later positioned one of the plurality of data units and an earlier positioned one of the plurality of data units at the higher data handling layer

of the transmitting entity, upon determining the first transmission link is broken, if at least an implied acknowledgement of receipt of the at least one earlier positioned one of the plurality of data units in the sequence is not received from the receiving entity at the lower data handling layer of the transmitting entity;

establishing a second transmission link between the transmitting entity and the receiving entity; and

retransmitting, via the second transmission link, the at least one earlier positioned one of the plurality of data units and the at least one later positioned one of the plurality of data units buffered at the higher data handling layer of the transmitting entity.

10. (Previously Presented) A data transfer procedure as claimed in claim 9, wherein the higher data handling layer of the transmitting entity comprises a store for storing data units, and further comprising maintaining buffered data units in the store until a corresponding acknowledgement of receipt has been received, when the corresponding data unit is then removed from the store.

11. (Previously Presented) A data transfer procedure as claimed in claim 9, wherein receiving the acknowledgement further comprises receiving an indication of the respective position of the at least one later positioned one of the plurality of data units.

12. (Canceled)

13. (Previously Presented) A data transfer procedure as claimed in claim 9, wherein the first transmission link is determined to be broken by:

the transmitting entity waiting for a period of time for an acknowledgement of receipt of at least one of the plurality of data units from the lower data handling layer of the receiving entity;

retransmitting the at least one of the plurality of data units;

repeating the waiting and the retransmitting of the at least one of the plurality of data units; and

deciding that the first transmission link is broken after the waiting and the retransmitting of the at least one of the plurality of data units have been repeated a number of times.

14. (Canceled)

15. (Previously Presented) A data transfer procedure as claimed in claim 9, wherein the transmitting entity is a mobile station for a GPRS system.

16. (Previously Presented) A data transfer procedure as claimed in claim 15, wherein the higher data handling layer is an SNDCP layer and the lower data handling layer is an LLC layer.

17. - 24. (Canceled)

25. (Previously Presented) A transmitting entity for transmitting data of a data sequence to a receiving entity in a communications system, the transmitting entity comprising:

a higher data handling layer;

a lower data handling layer;

means for transferring down from the higher data handling layer of the transmitting entity to the lower data handling layer of the transmitting entity a plurality of data units of the data sequence, wherein each of the plurality of data units has a relative position in the data sequence;

means for buffering, at the higher data handling layer of the transmitting entity, the plurality of data units;

means for transmitting on a first transmission link from the lower data handling layer each of the plurality of data units to the receiving entity;

means for buffering, at the lower data handling layer of the transmitting entity, the plurality of data units;

means for receiving at the lower data handling layer an acknowledgement of receipt of at least one later positioned one of the plurality of data units from the receiving entity;

means for sending a confirmation of receipt of the at least one later positioned one of the plurality of data units from the lower data handling layer to the higher data handling layer based on the acknowledgment;

means for discarding in-sequence any buffered data units at the higher data handling layer of the transmitting entity based on received confirmations;

means for determining that the first transmission link is broken;

means for purging the buffered plurality of data units at the lower data handling layer of the transmitting entity upon determining the first transmission link is broken;

means for maintaining the buffering of the at least one later positioned one of the plurality of data units and an earlier positioned one of the plurality of data units at the higher data handling layer of the transmitting entity, upon determining the first transmission link is broken, if at least an implied acknowledgement of receipt of the at least one earlier positioned one of the plurality of data units in the sequence is not received from the receiving entity at the lower data handling layer of the transmitting entity;

means for establishing a second transmission link between the transmitting entity and the receiving entity; and

means for retransmitting, via the second transmission link, the at least one earlier positioned one of the plurality of data units and the at least one later positioned one of the plurality of data units buffered at the higher data handling layer of the transmitting entity.

26. (Previously Presented) A transmitting entity as claimed in claim 25, wherein the higher data handling layer of the transmitting entity comprises a store for storing data units, and further comprising maintaining buffered data units in the store until a corresponding acknowledgement of receipt has been received, when the corresponding data unit is then removed from the store.

27. (Previously Presented) A transmitting entity as claimed in claim 25, wherein receiving the acknowledgement further comprises receiving an indication of the respective position of the at least one later positioned one of the plurality of data units.

28. (Canceled)

29. (Previously Presented) A transmitting entity as claimed in claim 25, wherein the means for determining that the first transmission link is broken is operable to:

wait for a period of time for an acknowledgement of receipt of at least one of the plurality of data units from a lower data handling layer of the receiving entity;

retransmit the at least one of the plurality of data units;

repeat the waiting and the retransmitting of the at least one of the plurality of data units;
and

decide that the first transmission link is broken after the waiting and the retransmitting of the at least one of the plurality of data units have been repeated a number of times.

30. (Canceled)

31. (Previously Presented) A transmitting entity as claimed in any of claim 25, wherein the transmitting entity is a mobile station for a GPRS system.

32. (Previously Presented) A transmitting entity as claimed in claim 31, wherein the higher data handling layer is an SNDCP layer and the lower data handling layer is an LLC layer.

33. (Previously Presented) A transmitting entity for transmitting data of a data sequence to a receiving entity in a communications system, comprising:

a higher data handling layer;

a lower data handling layer;

wherein the higher data handling layer is arranged to transfer down to the lower data handling layer a plurality of data units of the data sequence, wherein each of the plurality of data units has a relative position in the data sequence;

wherein the higher data handling layer is arranged to buffer the plurality of data units;

wherein the lower data handling layer is arranged to transmit on a first transmission link each of the plurality of data units to the receiving entity;

wherein the lower data handling layer is arranged to buffer the plurality of data units;

wherein the lower data handling layer is arranged to receive an acknowledgement of receipt of at least one later positioned one of the plurality of data units from the receiving entity;

wherein the lower data handling layer is arranged to send a confirmation of receipt of the at least one later positioned one of the plurality of data units to the higher data handling layer based on the acknowledgement;

wherein the higher data handling layer is arranged to discard in-sequence any buffered data units based on received confirmations;

wherein the transmitting entity is arranged to determine that the first transmission link is broken;

wherein the lower data handling layer is arranged to purge the buffered plurality of data units at the lower data handling layer of the transmitting entity upon determining the first transmission link is broken;

wherein the higher data handling layer of the transmitting entity is arranged to maintain the buffering of the at least one later positioned one of the plurality of data units and an earlier positioned one of the plurality of data units at the higher data handling layer of the transmitting entity, upon determining the first transmission link is broken, if at least an implied acknowledgement of receipt of the at least one earlier positioned one of the plurality of data units in the sequence is not received from the receiving entity at the lower data handling ~~level~~ layer of the transmitting entity;

wherein the lower data handling layer is arranged to establish a second transmission link between the transmitting entity and the receiving entity; and

wherein the lower data handling layer is arranged to retransmit, via the second transmission link, the at least one earlier positioned one of the plurality of data units and the at least one later positioned one of the plurality of data units buffered at the higher data handling layer of the transmitting entity.

34 (Previously Presented) A transmitting entity as claimed in claim 33, wherein the higher data handling layer of the transmitting entity comprises a store for storing data units, and wherein the higher data handling layer of the transmitting entity is further arranged to maintain buffered data units in the store until a corresponding acknowledgement of receipt has been received, when the corresponding data unit is then removed from the store.

35. (Previously Presented) A transmitting entity as claimed in claim 33, wherein the acknowledgement further comprises an indication of the respective position of the at least one later positioned one of the plurality of data units.

36. (Previously Presented) A transmitting entity as claimed in claim 33, wherein the transmitting entity is arranged to determine that the first transmission is broken by:

waiting for a period of time for an acknowledgement of receipt of at least one of the plurality of data units from the lower data handling layer of the receiving entity;

retransmitting the at least one of the plurality of data units;

repeating the waiting and the retransmitting of the at least one of the plurality of data units; and

deciding that the first transmission link is broken after the waiting and the retransmitting of the at least one of the plurality of data units have been repeated a number of times.

37. (Previously Presented) A transmitting entity as claimed in claim 33, wherein the transmitting entity is a mobile station for a GPRS system.

38. (Previously Presented) A transmitting entity as claimed in claim 37, wherein the higher data handling layer is an SNDCP layer and the lower data handling layer is an LLC layer.

39. (Previously Presented) A transmitting entity as claimed in claim 33, wherein the higher data handling layer of the transmitting entity is arranged to maintain the buffering of the at least one later positioned one of the plurality of data units and an earlier positioned one of the plurality of data units based on a lower data handling layer of the receiving entity being restricted to passing complete data units in sequence up to a higher data handling layer of the receiving entity.

40. (Previously Presented) A data transfer entity as claimed in claim 39, wherein the at least one earlier positioned one of the plurality of data units comprises a plurality of segments, further comprising:

wherein the lower data handling layer of the transmitting entity is arranged to receive, from the lower data handling layer of the receiving entity, an acknowledgement for at least one of the plurality of segments;

wherein the transmitting entity is arranged to determine that the first transmission link is broken is based on not receiving, from the lower data handling layer of the receiving entity, an acknowledgement for at least one remaining one of the plurality of segments; and

wherein the transmitting entity is arranged to establish the second transmission link by exchanging messages between the lower data handling layer of the transmitting entity and the lower data handling layer of the receiving entity causing both the lower data handling layer of the transmitting entity and the lower data handling layer of the receiving entity to purge any buffered data units.

41. (Previously Presented) A data transfer procedure as claimed in claim 9, wherein maintaining the buffering of the at least one later positioned one of the plurality of data units and an earlier positioned one of the plurality of data units at the higher data handling layer of the transmitting entity is based on the lower data handling layer of the receiving entity being restricted to passing complete data units in sequence up to the higher data handling layer of the receiving entity.

42. (Previously Presented) A data transfer procedure as claimed in claim 41, wherein the at least one earlier positioned one of the plurality of data units comprises a plurality of segments, further comprising:

receiving, from the lower data handling layer of the receiving entity, an acknowledgement for at least one of the plurality of segments at the lower data handling layer of the transmitting entity;

wherein determining that the first transmission link is broken is based on not receiving, from the lower data handling layer of the receiving entity, an acknowledgement for at least one remaining one of the plurality of segments at the lower data handling layer of the transmitting entity; and

wherein establishing the second transmission link further comprises exchanging messages between the lower data handling layer of the transmitting entity and the lower data handling layer

of the receiving entity causing both the lower data handling layer of the transmitting entity and the lower data handling layer of the receiving entity to purge any buffered data units.

43. (Previously Presented) A data transfer entity as claimed in claim 25, wherein the means for maintaining the buffering of the at least one later positioned one of the plurality of data units and an earlier positioned one of the plurality of data units at the higher data handling layer of the transmitting entity is based on the lower data handling layer of the receiving entity being restricted to passing complete data units in sequence up to the higher data handling layer of the receiving entity.

44. (Previously Presented) A data transfer entity as claimed in claim 43, wherein the at least one earlier positioned one of the plurality of data units comprises a plurality of segments, further comprising:

means for receiving, from the lower data handling layer of the receiving entity, an acknowledgement for at least one of the plurality of segments at the lower data handling layer of the transmitting entity;

wherein the means for determining that the first transmission link is broken is based on not receiving, from the lower data handling layer of the receiving entity, an acknowledgement for at least one remaining one of the plurality of segments at the lower data handling layer of the transmitting entity; and

wherein the means for establishing the second transmission link further comprises means for exchanging messages between the lower data handling layer of the transmitting entity and the lower data handling layer of the receiving entity causing both the lower data handling layer of the transmitting entity and the lower data handling layer of the receiving entity to purge any buffered data units.